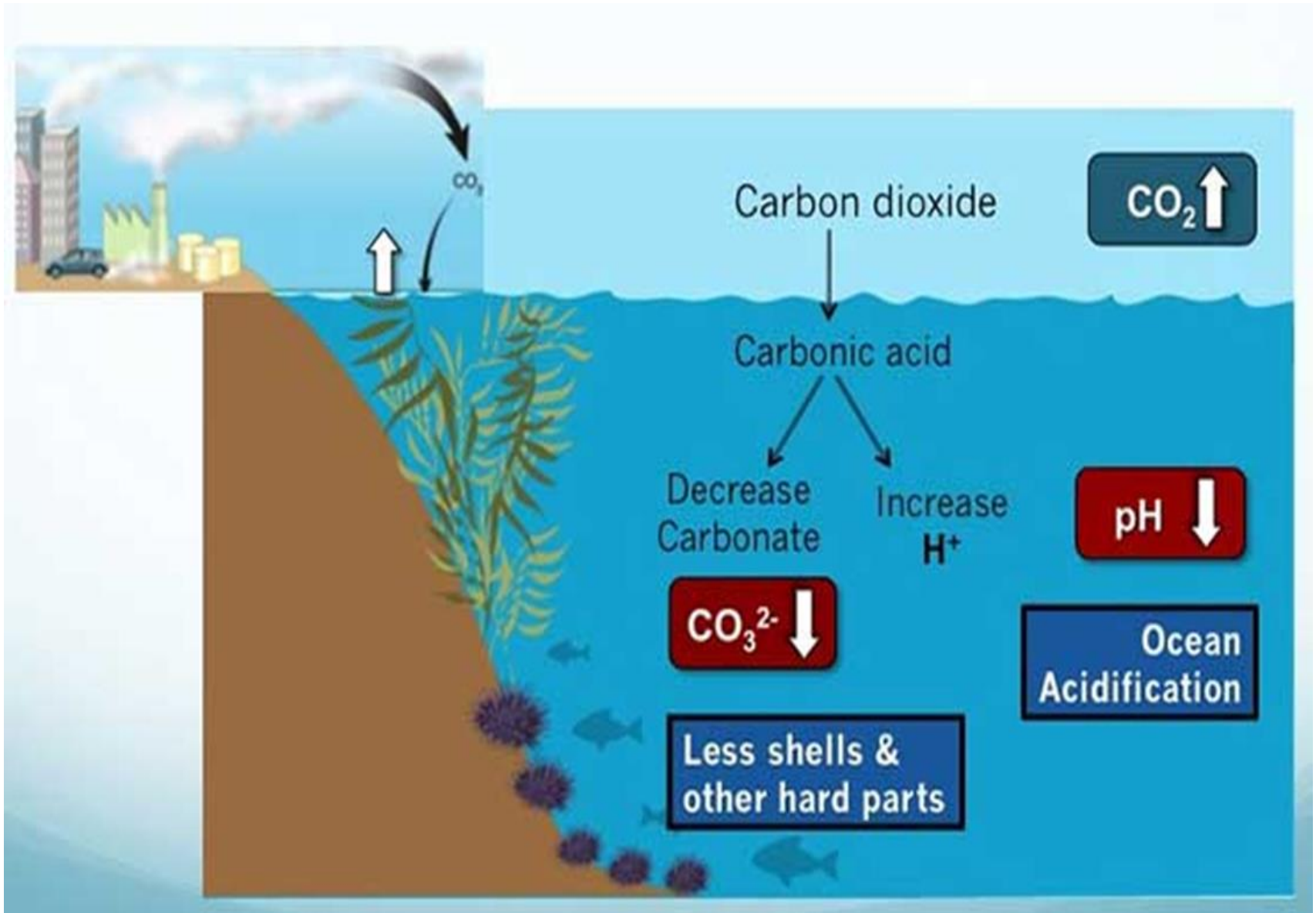


Monitoring Coastal Acidification in Massachusetts

MassBays Management Committee Meeting
July 26, 2017

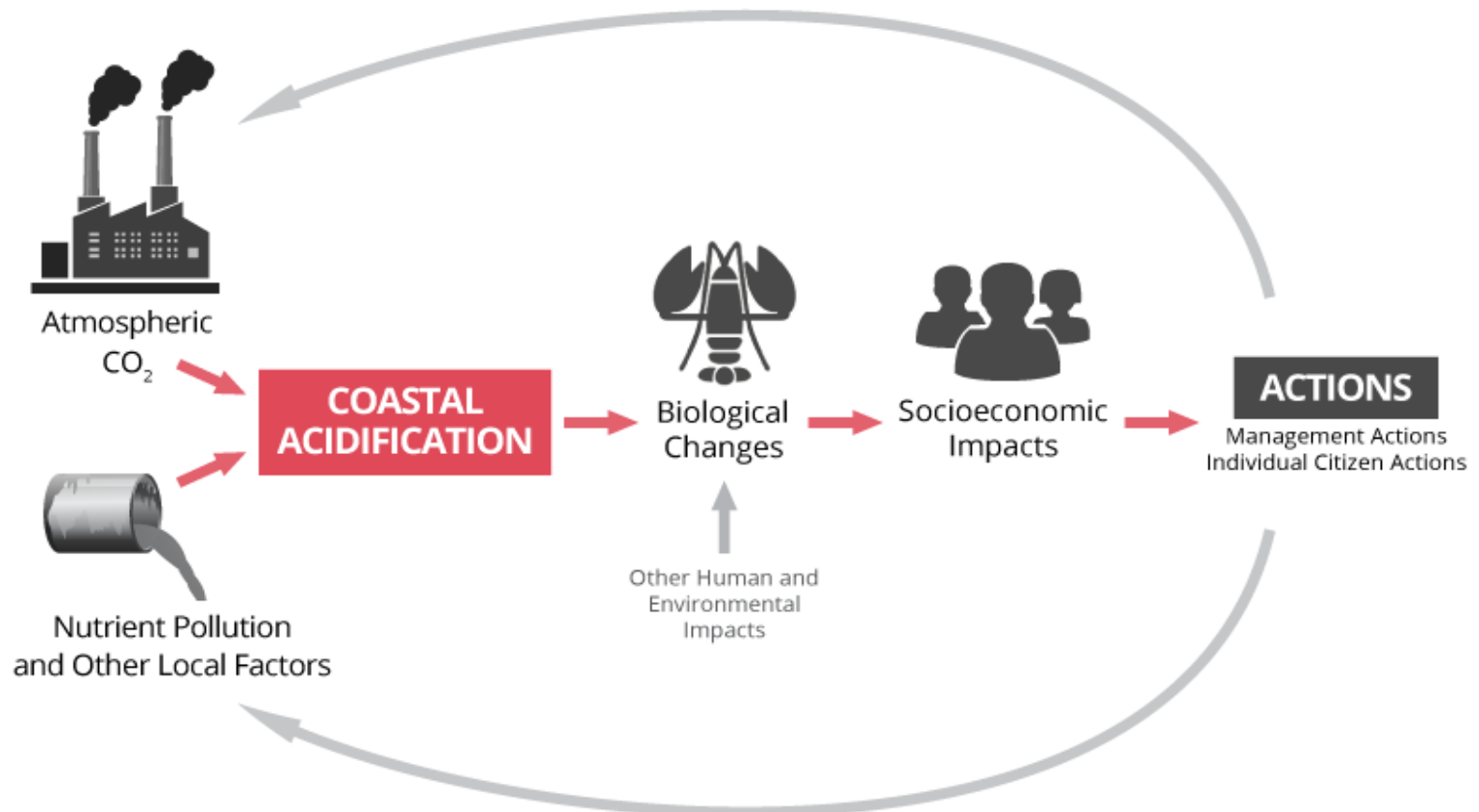
What is ocean acidification?



Hitting closer to home: Coastal Acidification

Causes include: atm. CO₂, excess nutrients (N, P), acid rain (NO_x, SO₂)

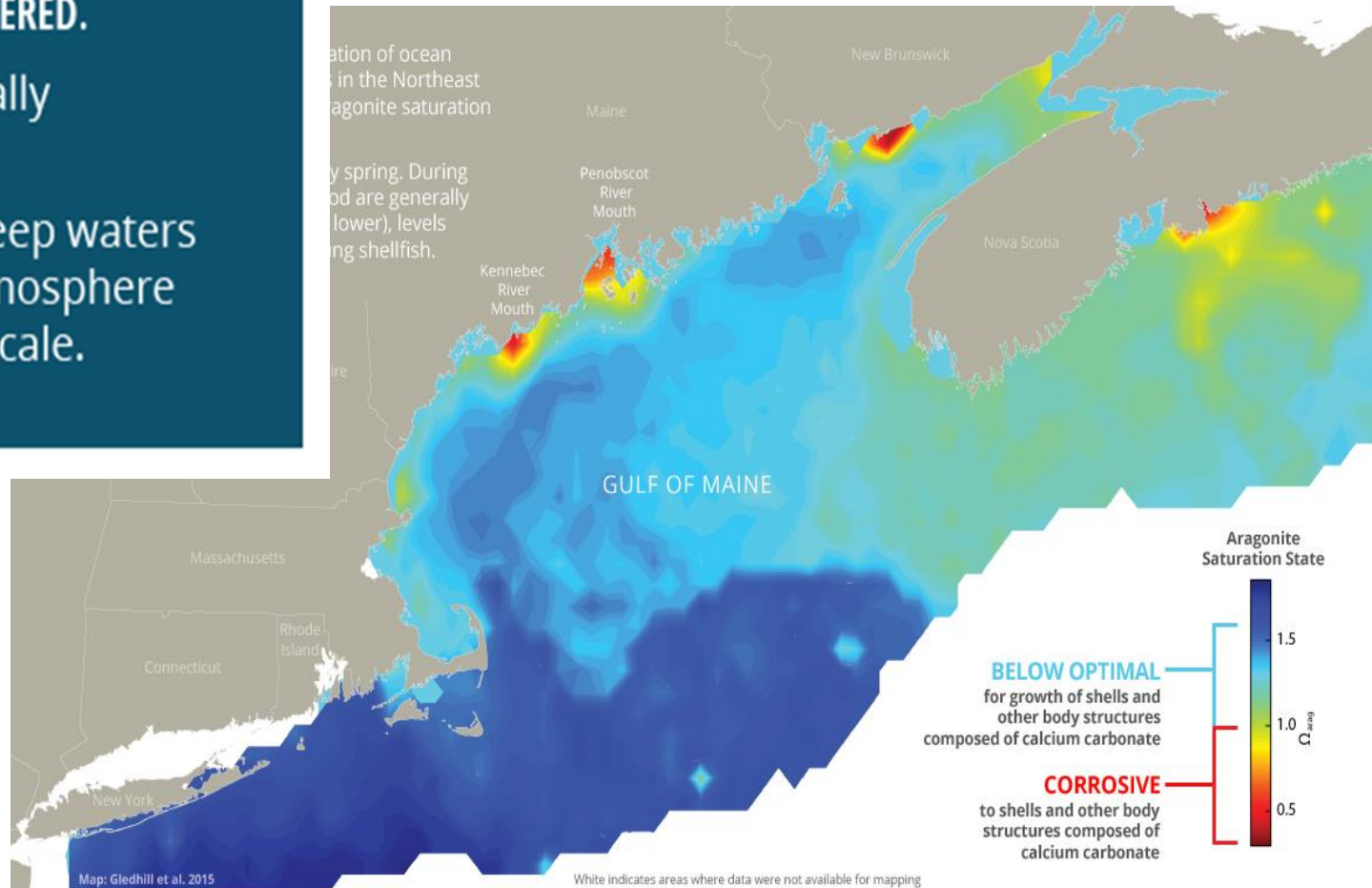
Links Between People and Coastal Acidification



Factors that make the Gulf of Maine sensitive to acidification:

- It's **COLD**.
- It's relatively **FRESH**.
- The freshwater entering from rivers is **POORLY BUFFERED**.
- It's strongly seasonally **PRODUCTIVE**.
- Both surface and deep waters interact with the atmosphere on an **ANNUAL** time scale.

New England Is Especially Vulnerable



Mapped distribution of minimum monthly averaged sea surface aragonite saturation state (Ω_{arag}) per Signorini *et al.*, 2013

Why keep an eye on coastal acidification?

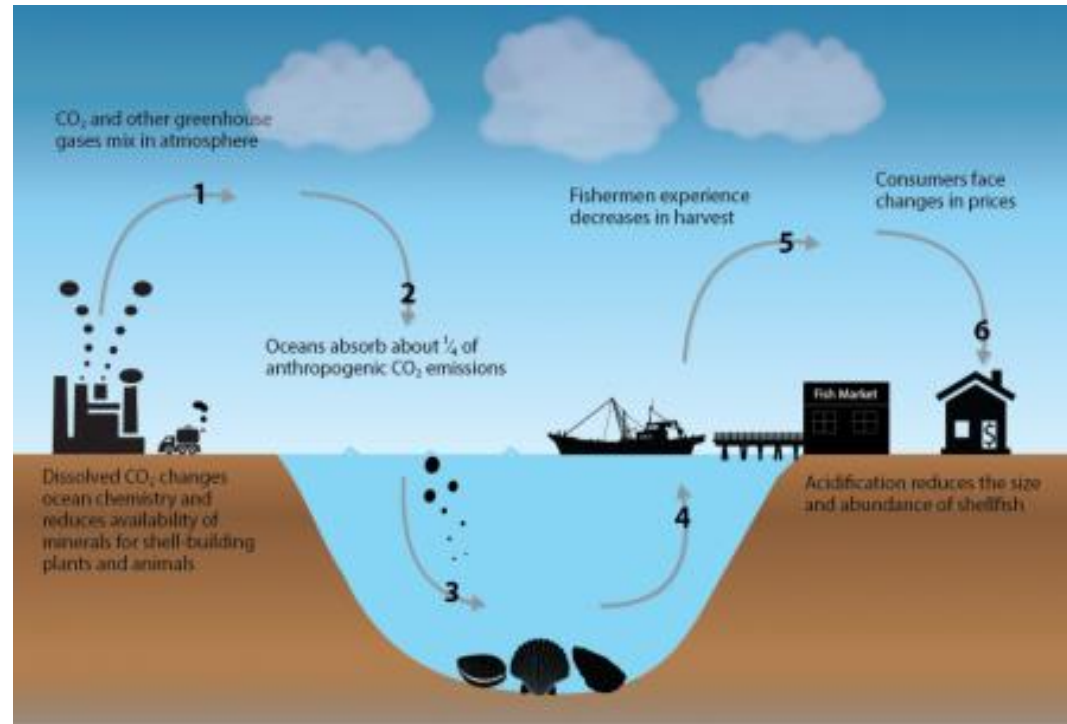
Impacts and implications

Habitats and species

- Shell and skeleton formation
- Food webs

Ecosystem services:

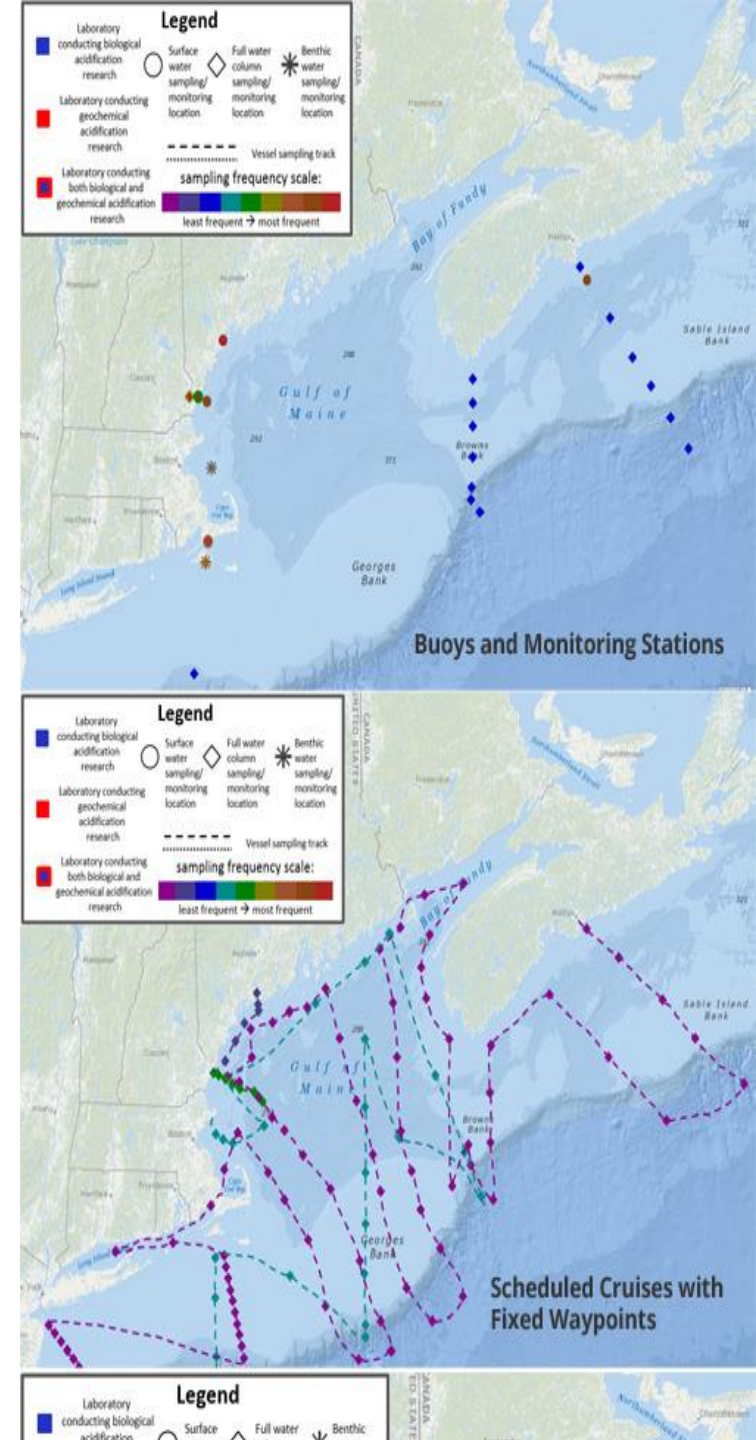
- Commercial fisheries, shellfisheries and aquaculture
- Recreational fisheries
- Subsistence and traditional shellfisheries and fisheries
- Recreational activities such as snorkeling and scuba diving



Economists predict that unchecked acidification could decrease shellfish harvests and increase consumer prices. EPA <https://www.epa.gov/ocean-acidification/effects-ocean-and-coastal-acidification-ecosystems>

Current efforts

- Northeast Coastal Acidification Network (NECAN)
- Monitoring: Buoys and monitoring stations, labs, ocean cruises & volunteer vessels
- Research: commercially important species, multistressor studies, climate change, trophic interactions, etc.



EPA: coastal acidification monitoring

- Understanding potential effects
- **Monitoring impacts (COOs)**
- Modeling to predict changes in ocean carbon cycle and resulting impacts
- Assessing socioeconomic impacts



Casco Bay (ME)

Mass Bay (MA)

Long Island Sound (NY)

Barneget Bay (NJ)

Tampa Bay (FL)

Corpus Christi/Coastal Bend

Bays and Estuaries (TX)

Santa Monica (CA)

San Francisco Bay (CA)

MassBays coastal observing system

Why?

- Impacts on ecosystems
- Expanding interest in aquaculture
- Investment by funders/socioeconomic impacts
- Growers and policymakers need more information...

Where? Duxbury Bay

Who? MassBays/UMass Boston

How? EPA \$

What is MassBays' role? for discussion

